To: Thurman, James[Thurman.James@epa.gov]; Bridgers, George[Bridgers.George@epa.gov]; Brode, Roger[Brode.Roger@epa.gov]
Cc: Andy Hawkins (hawkins.andy@epa.gov)[hawkins.andy@epa.gov]
From: Avey, Lance
Sent: Tue 3/1/2016 7:03:55 PM
Subject: FW: Ameren modeling information for Labadie

Forwarding along information on the methodology used by AECOM for combining Units 3 & 4 and calculating actual flow rates for Labadie. You can see the modeled flow rate used is an actual flow rate where it is derived by just using the ratio of the actual measured stack temperature to the standard stack temperatures. Andy and I have some thoughts on that, but wondering if the actual flow rate calculation used is acceptable? Curious if you all may have some thoughts on this methodology along with the provided combined flues methodology? May be something we can further discussed on todays call.

Thanks

Lance

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From: Wilbur, Emily [mailto:emily.wilbur@dnr.mo.gov]
Sent: Monday, December 21, 2015 1:58 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Cc: Hawkins, Andy <hawkins.andy@epa.gov>; Keas, Ashley <Ashley.Keas@dnr.mo.gov>
Subject: RE: Ameren modeling information for Labadie

Hi Lance,

This was one of the questions we had early on about using actual emissions data: fixed vs. standard vs. actual flows. If there is a preference, please let us know for future reference.

Here is the information we obtained from Ameren about how the actual flows were calculated:

The flows used are those that are reported to the CAMD system. These flows are in standard cubic feet per hour (scfh) which represents a temperature of 68 Deg F. We converted these flows to actual cubic feet per hour (acfh) using actual measured temperature in the stack assuming constant pressure. That is

$V_a = T_a * V_s / T_s$

Where

V_a – acfh

V_s – scfh

T_a – actual stack temperature (absolute Rankin or Kelvin)

T_s – standard stack temperature (absolute Rankin or Kelvin)

Velocity at stack top then based on stack exit area based on 20.5 ft diameter.

Combining flues:

1) Emission rate: The emission rate for Unit 3 and Unit 4 were summed.

2) Temperature: The combined temperature for Units 3 and 4 was calculated from the weighted average of the (Unit 3 temperature * Unit 3 velocity) + (Unit 4 temperature * Unit 4 velocity) / (Unit 3 velocity + Unit 4 velocity)

3) Velocity: The combined velocity for Units 3 and 4 was calculated from the sum of the Unit 3 and 4 velocities * (pi * (6.25 (single flue diameter)^2) / (pi * 8.84 (equivalent dual flue diameter)^2)

Please let me know if you have any questions.

Thanks,

Emily

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Friday, December 18, 2015 8:53 AM
To: Wilbur, Emily
Cc: Hawkins, Andy
Subject: Ameren modeling information for Labadie

Hi Emily,

As we continue to evaluate the sets on modeling inputs we have received for Labadie for 1-hr SO2, we are seeing some differences in the modeled inputs. Of note, the flow rates and thus exit velocities used are different for the provided modeling from MDNR, Sierra Club, and Ameren. MDNR used fixed exit velocities, SC used varying rates from CAMD, and Ameren used varying rates of which we are looking to confirm how Ameren's values were calculated.

Could you supply the calculation methodology for the exit velocities for the Ameren values and have them include all hourly parameters that were used in their calculation?

Thanks much,

Lance

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